

# Paleontology at Petrified Forest National Park



Fossil crayfish



Phytosaur skull



Fossil leaf



Petrified wood cross-section

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### What is Paleontology?

Paleontology is the scientific study of ancient life. Through the examination of fossils and the rocks in which they are found, paleontologists reconstruct the past. Paleontology is concerned with all aspects of the biology of ancient life forms: their shape and structure, patterns of change, taxonomic relationships with each other and with modern living species, geographic distribution and more.

Paleontology is divided into various subdisciplines, including:

*Micropaleontology*: study of generally microscopic fossils.

*Paleobotany*: study of fossil plants, including the study of fossil algae and fungi in addition to land plants.

*Palynology*: study of pollen and spores, both living and fossil, produced by land plants and protists.

*Invertebrate Paleontology*: study of invertebrate animal fossils, such as mollusks, echinoderms, insects, and others.

*Vertebrate Paleontology*: study of vertebrate fossils, from primitive fishes to mammals.

*Human Paleontology (Paleoanthropology)*: study of prehistoric human and proto-human fossils.

*Taphonomy*: study of the processes of decay, preservation, and the formation of fossils in general.

*Ichnology*: study of fossil tracks, trails, footprints, and other trace fossils.

*Paleoecology*: study of the ecology and climate of the past, as revealed both by fossils and by other methods.

Paleontologists are the private eye of the scientific world, piecing together clues to a distant past. This science incorporates knowledge from biology, geology, ecology, anthropology, archeology, and even computer science to understand the processes of life through time. Paleontology is a rich field, imbued with a long and interesting past and an even more intriguing and hopeful future.



Southwest in the Late Triassic Epoch. (Ron Blakey)



Coelophysis beneath the Late Triassic Epoch canopy. (Doug Henderson)

### The Park in the Past

As you drive through the park, you might see blossoming prickly pear cacti, dashing black-tailed jackrabbits, or a soaring redtail hawk. But what would you have seen if you were here during the Late Triassic Epoch?

From the fossils and sedimentary rocks of the Painted Desert, we know that this was a much wetter environment during the Late Triassic. More than 200 million years ago, this region was located not far from the equator as part of the supercontinent Pangaea. Many researchers believe that it was a tropical landscape, dominated by a great river system as large and complex as the modern Mississippi or Amazon. Many tributaries flowed toward the main river, the water eventually making its way towards the coast. Galleries of trees grew along the waterways as well as horsetails and ferns. Other species of plants grew nearby. During rainy seasons, the rivers would swell, carrying debris such as logs, large cobbles, and even dead animals. As the waters subsided, debris was left on sandbars and along the waterways to be covered with more sediment as time passed. Dead animals, plants, and logs rotted away or became fossilized, remaining to tell the story of their environment.

As you walk the trails, imagine your feet sinking down into soft mud, perhaps feeling the swirl of water against your legs. Smell the humid, green odors of growth and decay. What was that splash? Perhaps a crocodile-like phytosaur?



### Petrified Forest's Paleontological Collections

Imagine a place that holds some of Earth's secrets from millions of years ago. This place is found within the paleontological collections of the Petrified Forest National Park Museum Collection. More than 17,000 paleontological specimens and objects stored at the park represent the paleobotanical, vertebrate, invertebrate, and trace fossil materials found at the park, including more than 70 type specimens (the original specimens used when a new species of plant or animal was first described to science). Whether it's petrified wood or jasperized freshwater mollusks, the collection provides us with a glimpse of what this region was like over 200 million years ago. The Chinle Formation (the main geological formation of the park) is filled with fossil materials that have provided the basis for in-depth study of the Late Triassic and a legacy of research that continues to draw scientists from all over the world to study the paleontological resources of the park.

Due to the importance of the collection and to help researchers study it properly, the park's Resource Management staff has several projects underway, involving the organization/cataloguing of important research documentation and the curation of museum specimens. On the National Park Service's website for museum collections (<http://www.museum.nps.gov>) a portion of the Petrified Forest's fossil collections is arranged by scientific name. Detailed information and images are also located at this site. The collection provides a window of discovery into the Late Triassic Epoch of our world's natural history—its flora, fauna, and geology, an aid to understanding and education among researchers, park staff, and park visitors.

For more information please contact: the Museum Curator at (928) 524-6228



Scott Williams, Museum Curator, with phytosaur skull